

# Technology Investment Request (TIR) Template

# LARGE

## A Cover Page

<b>Project Title</b>		<b>Submittal Date</b>
Computer Facility Mainframe Hardware and Software Upgrade		08/09/2002
<b>Department Name</b>		
Department of Information Technology		
<b>Subgroup Name</b>		
Computer Facility		
<b>Project Summary</b>		
<p>Product support for our existing mainframe hardware will be discontinued during the FY04-05 biennium. This loss of support will place the State Information Technology Department at risk for unsupported failure of applications and hardware that is integral to the day to day operations of many State Agencies. In addition, increasing capacity demands are driving the need to upgrade our current environment. This proposal replaces the current hardware and provides the necessary capacity through the next biennium. We estimate the hardware cost at \$1,944,400 with an additional one-time charge for software licensing increases of \$1,409,213. An additional \$114,000 would be required annually to support increased hardware maintenance and \$1,062,374, also annually, to support increased software licensing costs.</p>		
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## **C Business Program**

### **C.1 Business Program Background**

The Department of Information Technology, Computer Facility provides mainframe computing resources on which many of the state's essential computing needs reside. All major state agencies depend on these centralized computing resources. Applications such as Welfare's NOMADS and DMV's Genesis applications are key components that are serviced by the mainframe resources.

### **C.2 Business Program Objectives & Goals**

The Computing Group provides the necessary mainframe hardware, software and support resources required for agency applications. Our primary objective is to satisfy the needs of our customers, the agencies, through delivery of reliable centralized computing resources. This objective also demands that we provide appropriately sized, recoverable solutions.

### **C.3 Business Program Issues & Opportunities**

Two signification factors are the primary motivation for the expenditure to replace the Mainframe. The support horizon for our existing hardware is approaching its end. The current generation operating systems are no longer compatible with our R35 mainframe. In addition to the termination of support, existing computing resource utilization continues to grow. As agency needs increase, additional resources must be enhanced to accommodate them. Significant applications such as NOMADS consume a large portion of our existing capacity and as a result, their growth is a key factor in our system upgrade request.

### **C.4 Business Program Mandates and Requirements**

There are no external mandates or requirements that are currently driving the upgrade proposal.

### **C.5 Business Program Partners & Customers**

Because of the nature of our business program, it interacts directly with the customers of each of our agencies. This includes, but is not limited to, constituents, businesses, local governments and other state agencies.

## **D Existing Situation – “As Is” Environment**

Currently, the state computing facility has an IBM 9672-R35 and an IBM 9672-R46 that provide 165 mips and 447 mips respectively. Mips are used as a general measurement to determine relative capacity. As the systems exist now, our peak time utilization on these two boxes are at 75% and 73% respectively. The peak time utilization continues to increase and we project that this utilization will saturate the combined mainframe utilization in the early part of next biennium. Though several smaller agencies have

moved their applications away from the centralized mainframe resources, the overall consumption of resources continues to increase. We expect this trend to continue indefinitely as a result of continuing development and growth of individual agency application requirements. Additional growth trend information can be found in Appendix 5, *Mainframe Sysplex, Today, Tomorrow and Beyond*.

## **E Proposed Changes – “To Be” Environment**

The implementation of an IBM Z900 series Enterprise Server will replace the current R46, R35 and Coupling Facility. The Z900 is composed of four processors and an internal coupling facility. The Z-Series hardware represents current technology from IBM and as a result will be supported by IBM for a number of years. Additionally, the Z900 provides 835 mips which represents a 36% increase in capacity. This will satisfy the projected growth trend throughout the FY04-05 biennium.

## **F Functional & System Requirements**

The replacement system must continue to provide the facility to operate existing applications as currently implemented. It must also provide a reasonable degree of longevity with respect to support horizon. Additionally, the system needs to provide sufficient capacity to accommodate the growing resource demand.

## **G Proposed Solution**

### **G.1 Overview**

As discussed in §E of this document, the existing two mainframes and their coupling facilities will be completely replaced by the new Enterprise Server, providing on-going support from the vendor and the additional capacity necessary to sustain operations throughout the biennium.

### **G.2 Acquisition/Development Approach**

The acquisition of the system will occur as a direct purchase from IBM, Inc. We plan to install the system in parallel with the existing systems during the testing and implementation phases and then shutdown and retire the existing mainframes once migration is complete.

### **G.3 Architecture, Technology & Equipment**

#### **G.3.1 Statewide Standards**

There are no existing standards regarding mainframe platform.

### **G.3.2 Fit with Existing Technical Environment**

The existing equipment will be replaced with hardware from the same vendor and as a result should have minimal impact on the existing technical environment. This is also a differentiating factor with regard to the Z800 alternative (discussed later). Multiple Z800s would present significant challenges in the area of I/O connectivity in our existing environment.

### **G.3.3 Wide Area Network Connectivity**

Existing network connectivity from both the LAN and WAN perspectives will be migrated to the new box. There will be no significant impact to the architecture or utilization of the network resources.

### **G.3.4 System Hosting**

This is a central computing resource and will continue to be hosted at the Computing Facility. Temporary space requirements will exist while the system is brought online and applications are migrated. After the implementation phase, the Enterprise Server will consume slightly less floor space than currently occupied by the existing mainframes.

## **G.4 Impact on Existing Systems**

Existing mainframe services will be migrated to the new platform. Significant efforts will be required to migrate, test and deploy agency applications to the new hardware architecture. This will require system unavailability during the “go-live” phase of each application migration.

## **G.5 Impact on People**

Systems programmers involved in the implementation of the system will require training. We do not expect any additional or reduced personnel requirement as a result of this transition. Persons responsible for agency applications will be required to assist in the migration, testing and implementation of their individual application during the transition. All of our major customers have been notified of the intent to upgrade our hardware and are aware of the potential involvement of their staff.

The project will require partial FTEs throughout the Computing Group staff. Project management and technical skills needed to implement this project will be provided by existing personnel. All other projects will be placed on hold and it is estimated that between 1200 and 2000 hours of comp time will be needed to complete the project.

Agency and application users will experience service interruption during the implementation phase of the project. We expect the overall service interruption to be small due to the planned testing of the system. The implementation will not occur until the essential applications and utilities have been tested, and as a result,

we will have managed the interruption to impact State operations as minimally as possible.

## **G.6 Impact on Existing Processes**

Existing processes should not be affected in any way if the Z900 replacement is approved.

If the upgrade is approved, significant efforts will need to be shifted to properly allocate work between the two existing machines. This will require relocation of agency applications and service interruptions associated with those efforts.

In the event that no replacement or upgrade is approved and support for the R35 is discontinued, the State will be placed in a critical situation. In addition to the support horizon, should capacity become a concern as it is projected to, significant impact to all State operations that rely on the mainframe from resources will be impacted. Examples would include longer processing at the Department of Motor Vehicles and potential processing issues with Welfare checks, all of which have significant political ramifications.

## **G.7 Impact on Other Entities**

As described in §G.5, other agencies will need to contribute time and expertise to assist in the relocation of their applications. We expect the platform change and consolidation of R46 and R35 to require resources for application and system configuration modification. These resources are available internally and within the agencies and should not require additional staff.

## **G.8 Security**

Existing security models and policies will be migrated to the new hardware. No significant impact is expected.

## **G.9 Electronic Records Archiving**

Existing processes regarding records archiving will remain intact.

## **G.10 Training**

Training is required to ensure in the smooth implementation of the Enterprise Server. High level training for the product has already started and will continue through fiscal year 2003. Many key members of the project implementation team have already started training with existing funding. Training plans have been developed with the potential upgrade in mind and have been formally assembled as part of an overall training plan for the Computing Unit. We expect additional training to become available as part of the negotiations with the vendor.

## **G.11 High Level Project Organization, Management & Schedule**

The implementation of the new hardware will consist of several phases. A detailed project plan is currently being drafted. The initial phase will research the interoperability of the operating system and applications and highlight any known

issues. The second phase will prepare for the arrival of the new Enterprise Server from a physical and planning perspective. Once the new hardware arrives, phase three will bring the system online and handle initial configuration and testing of core systems. Phase four will pilot several agency applications. The final testing of major agency applications will conclude in phase five. The system will be moved into production mode and applications will be migrated for the final time from the old system in phase six. Finally, phase seven will address post-implementation issues. Though there are a number of phases that exist within the project, we expect phases three through six to be completed in approximately sixty to ninety days. Phases one and two have already begun and will continue over the coming months. Phase seven will be comprised of a very critical several hours after implementation and last seven to ten days after to ensure that all applications are operating within normal limits.

Dan Goggiano, Capacity Planner, will serve as the Technical Project Manager. We will be able to adequately reassign workloads as necessary to provide sufficient time within Dan's schedule to manage the project. The Computing Facility staff has successfully replaced and upgraded their architecture several times and we continue to be confident that we will be able to adequately manage the project internally. The implementation team will be a cross-functional team selected from the various groups within the Computing Unit.

The project will be subject to oversight by the ITPOC and will receive Quality Assurance review by DoIT Management.

## **G.12 Alternatives Considered**

There are three other alternatives that have been considered. The first alternative was to replace the existing hardware with multiple IBM Z800 series boxes. We found this alternative to be more costly in the short term and more administratively intensive over the long term.

The second alternative was to upgrade the processors in the R35 to the next generation processors making it an R36. This would extend the support window and potentially provide the additional capacity required to get through the biennium for somewhat less initial investment. *A primary cost risk associated with this plan is that we would still be required to expend the capital in the 2006-2007 biennium for a replacement due to ending support.* Also, a complex migration of several applications would need to occur between the two mainframes. Finally, this is a short term solution that would put the burden on the State three years from now, and would force the purchase of the replacement well into its life cycle diminishing the return on investment over the long term outlook due to the requirement to eventually replace the new system.

The third and final alternative was a no upgrade, no replacement scenario. This places the State at risk from both a support and capacity perspective and does not qualify as a reasonable alternative.



## **H Benefits to the Public**

### **H.1 Accountability**

The Enterprise Server implementation will not directly make the Information Technology Department more accountable to the public, but will enable organization to further explore application enhancements that would otherwise be unavailable due to capacity or support constraints.

### **H.2 Access**

Access improvement is similar to the Accountability statement made in §H.1. The hazards of not approving the replacement plan include significantly reduced accessibility in the event of utilization saturation. This replacement safeguards the existing services levels that exist for our mainframe customers.

### **H.3 Ease of Use**

Ease of use improvement is similar to the Accountability statement made in §H.1.

### **H.4 Convenience**

Convenience improvement is similar to the Accountability statement made in §H.1.

### **H.5 Quality**

As a platform, the IBM Enterprise Server continues to be one of the most reliable, well trusted available. The design of the Z900 will significantly improve our ability to provide internal redundancy and system availability. Additional features include the ability to increase capacity for both memory and CPU resources without significant interruption of services. This reduces the effort required to upgrade in the future. All of these combined provide a better performing, more available system for the constituents of this state.

### **H.6 Other**

Not applicable.

## **I Benefits to the State**

### **I.1 Operational Efficiency & Productivity**

The replacement Z900 series Enterprise Server will reduce the complexity of the existing mainframe environment and at the same time provide additional features that can potentially lead to more efficient and productive Computing Facility services and staff. We will be able to create additional logical partitions to help separate work within the computer as well as take advantage of some of IBM's new Capacity on Demand functionality which helps us accommodate short periods of increased utilization.

## **I.2 Financial**

The implementation of the new Enterprise Server will not generate additional revenue for the Computing Facility. There is a cost avoidance opportunity in replacement rather than upgrade. Our proposal to replace will eliminate the need to upgrade the current systems which then may be able to support the organization at slightly less upfront cost. The risk associated with the upgrade is that during the next biennium all support will certainly be discontinued and we will need to replace the mainframes at that time. This generates a greater cost over a two biennium period than necessary.

## **I.3 Functional Integration**

The functional integration aspects are addressed in §I.1.

## **I.4 Other**

All benefits to the State have been highlighted in other sections.

# **J Risk Assessment**

## **J.1 Project Management & Oversight**

Past hardware and software implementations of this nature have been successfully managed by the Computing Facility staff. We expect that we will be able to adequately allocate resources for the development and implementation of this plan as we have historically in similar cases.

## **J.2 Political Ramifications**

The two political aspects that exists within this project are the ramifications of *not* upgrading and the controversy over mainframe versus open systems solutions. The greatest ramification is the performance degradation that will occur during the second half of FY04 and continue into FY05 if the system is not upgraded. Widespread agency application performance issues will cause significant delays in customer service across all functions of the state. It is clear that state agencies continue to leverage the reliability and ease of use of the mainframe within their key applications. Most organizations continue to increase their utilization. This demands on the Department of Information Technology continue to support the enviroment and expand the resources as necessary to meet growing demand. Open systems are not an option due to the overwhelming cost of code conversion and on-going administration involved.

## **J.3 Cost**

The intangible costs associated with having insufficient performance on the centralized mainframe resources are significant. Utilization saturation will occur during the FY04-05 biennium and will dramatically reduce overall throughput for every agency. This will result in delays in agency processes, applications and in

the end, our constituents. Additional detail has been provided as part of the mainframe upgrade research document attached as Appendix 5.

#### **J.4 Complexity**

The replacement effort will be moderately complex. The Computing Facility staff has had experience replacing and upgrading their hardware and software on a continuous basis so we do not expect to have any insurmountable issues arise. The combined experience of the staff minimizes the risk associated with the implementation.

#### **J.5 Mandatory External Deadline**

There are no applicable external deadlines other than the dropping of IBM support on the current software and inability to upgrade to the current release of the operating system due to hardware constraints.

#### **J.6 Impending Legislation or other Externally Imposed Changes**

There are no applicable Legislative or other externally imposed changes that should affect the timeline of this project.

#### **J.7 Security**

##### **J.7.1 Information Confidentiality**

Security will continue to take the same form as currently employed within the mainframe architecture. We are constantly making our systems more secure and better protected from unauthorized access and use.

##### **J.7.2 Communications & Access Security**

See §J.7.1 for additional information.

#### **J.8 Other**

IBM has scheduled the support for our existing R35 mainframe to be discontinued in December 2004.

Delaying the replacement will increase the total cost and lower the return on investment over the long term by adding the incremental upgrade cost, but retaining the requirement to eventually replace the system.

The potential impact of not suitably sizing our environment for the projected growth is very significant. If the growth trend continues, statewide agency applications will experience severe performance degradation.

IBM has provided well integrated, compatible platforms for many years. We expect to have some compatibility and configuration issues during the implementation but are confident that they will be resolved in a timely manner without impact to production systems. Every system migration has challenges that are unexpected but the expertise that exists within the Computing Facility staff will surely minimize and risk associated with the system change.

## **K Cost**

### **K.1 Project Cost**

#### **K.1.1 Table 1 - Project FTE**

#### **K.1.2 Table 2 - Project Costs**

### **K.2 Ongoing Cost**

#### **K.2.1 Table 3 - Ongoing FTE**

#### **K.2.2 Table 4 - Ongoing Costs**

### **K.3 Total Cost of Ownership**

#### **K.3.1 Table 5 – Total Cost of Ownership**

### **K.4 Funding Sources**

#### **K.4.1 Table 6 – Funding Sources**

## **L Approval**

## L.1 Management Review

	Yes	No
Is this initiative mandated? If so, supporting information should be included.		
Is this initiative referenced in your agency's biennial strategic plan and goals?		
Is this initiative consistent with the agency's and State's policies, standards and guidelines?		
Is the project in compliance with federal policy regarding the Americans with Disabilities Act?		

## L.2 Approvals

Responsibility	Approval Signature and Title	Date
Project Sponsor:		
Agency Administrator:		
Department Director:		
DoIT Director:		
Comments:		